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RHOPALUS (BRACHYCARENUS) TIGRINUS, RECENTLY ESTABLISHED IN NORTH AMERICA, WITH A KEY TO THE GENERA AND SPECIES OF RHOPALIDAE IN EASTERN NORTH AMERICA (HEMIPTERA: HETEROPTERA)

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Abstract.—Rhopalus (*Brachycarenus*) *tigrinus* (Schilling) was collected in New Jersey in 1977, the first record of this European species for North America; it also has been found in Pennsylvania and on Long Island, New York. This rhopalid is briefly described and its dorsal habitus, diagnostic external features, and male genitalic characters are illustrated. Known host plants of the family Cruciferae are recorded, and North American locality records are listed and mapped. A key to the genera and species of Rhopalidae in eastern North America is presented, including for the first time *R. tigrinus*.

A European scentless plant bug, *Rhopalus* (*Brachycarenus*) *tigrinus* (Schilling), was recently reported new to North America (Hoebeke, 1977). This detection resulted from the USDA-APHIS "High Hazard Pest Survey" program and was based on specimens submitted (to ERH) for identification. The first North American collection of this species consisted of specimens taken in southern New Jersey in 1977. We initiated a survey of portions of south-central and southern New Jersey to determine the distribution and relative abundance of this newly detected species, and to gather information on its biology, seasonal history, and host plant preferences.

In this paper we describe and illustrate the important adult characters of *R. tigrinus*, record its known host plants, list and map locality records in North America, and provide a key to the genera and species of Rhopalidae in eastern North America, including *Rhopalus tigrinus*.

The adults of *Rhopalus tigrinus* (Fig. 1) closely resemble those of some native species of rhopalids occurring in eastern North America (especially species of *Arhyssus*, *Niesthrea*, and *Liorhyssus*), but may readily be distin-

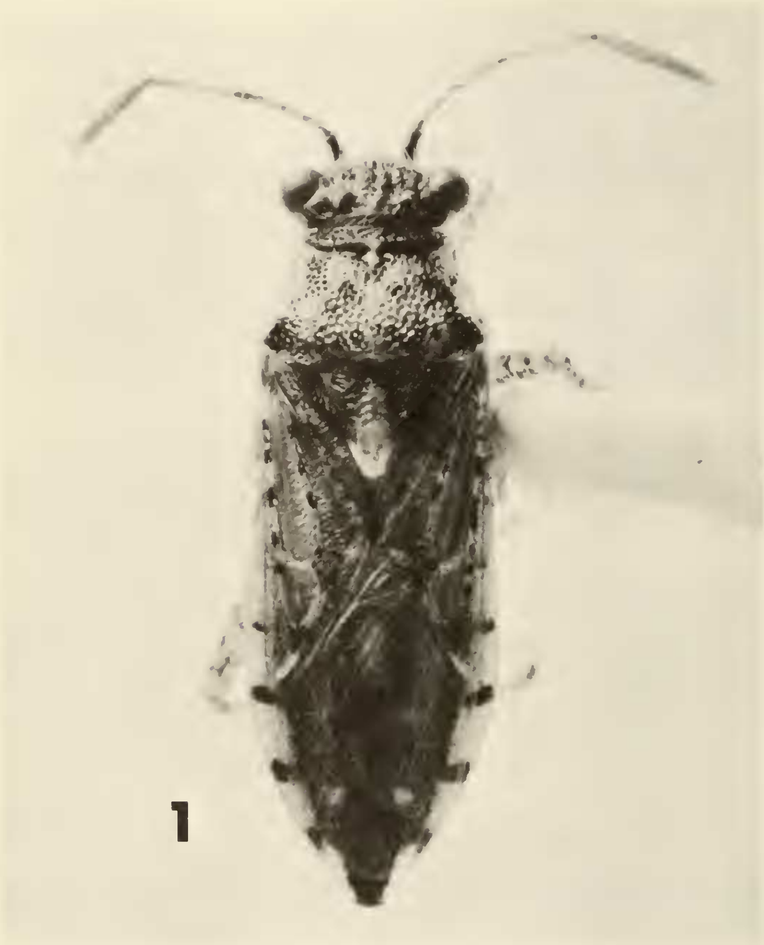
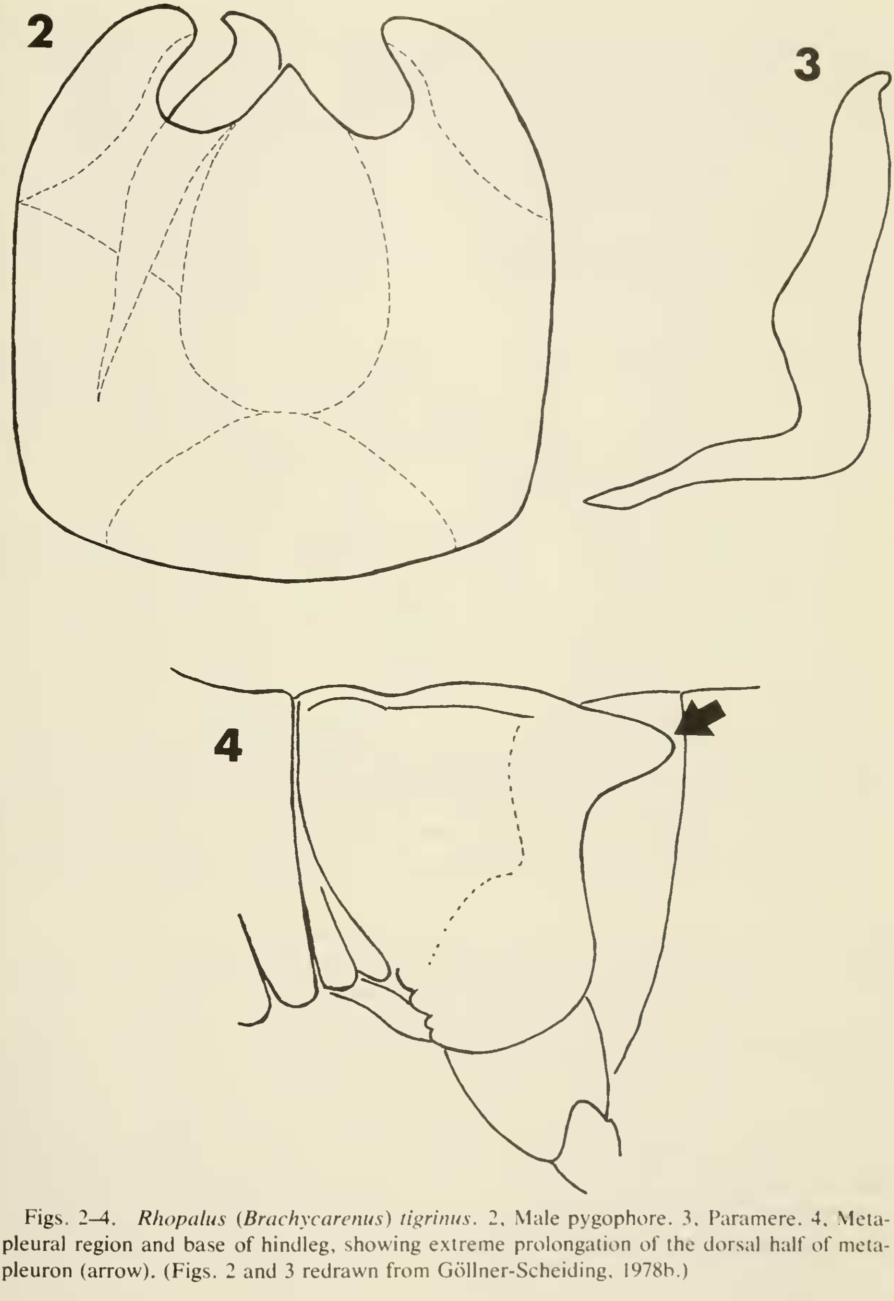


Fig. 1. *Rhopalus (Brachycarenus) tigrinus,* dorsal habitus.

guished by the following diagnosis: Head more than 1½× as broad as long; bucculae covering ⅔ the length of 1st rostral segment in profile; rostrum not usually extending beyond mesosternum; metapleuron with posterior margin strongly angulate with prominent postero-lateral projection (Fig. 4); male pygophore and paramere as in Figs. 2, 3; dorsal coloration yellowish or grayish with black markings on the head, anterior margin of the pronotum, anterior corners of the scutellum, and spots on the veins of the hemelytra; abdomen beneath hemelytra black except for yellow markings at apex; connexiva generally yellow, sometimes with black spots; 6.5–7.0 mm in length.

Rhophalus tigrinus is considered a relatively common species in the Pale-

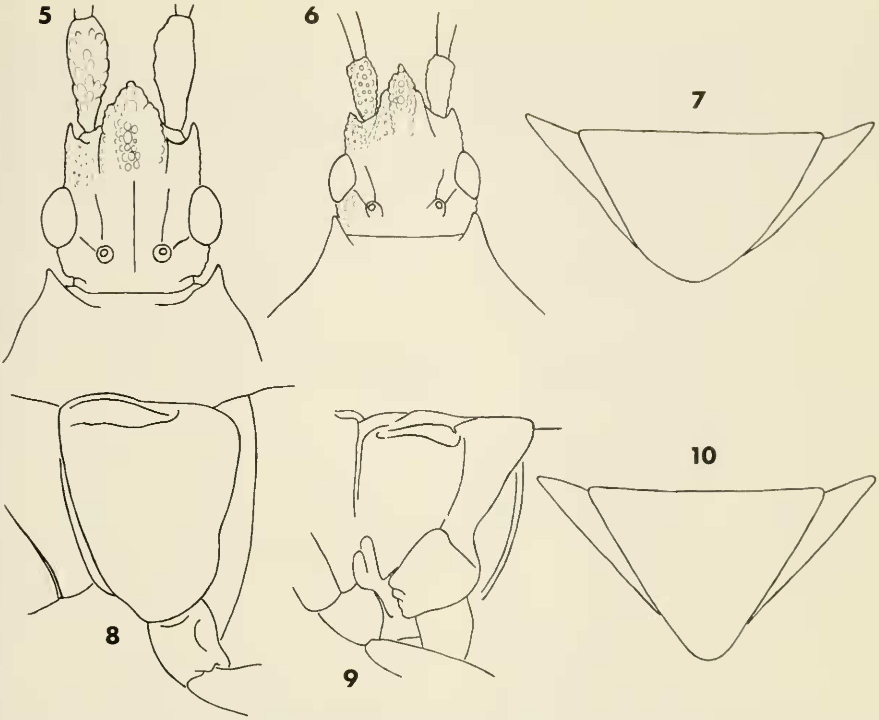


Figs. 2–4. *Rhopalus* (*Brachycarenus*) *tigrinus*. 2, Male pygophore. 3, Paramere. 4, Metapleural region and base of hindleg, showing extreme prolongation of the dorsal half of metapleuron (arrow). (Figs. 2 and 3 redrawn from Göllner-Scheiding, 1978b.)

arctic Region, found throughout much of Europe (except the British Isles) and the Mediterranean Region including Algeria and Morocco, Madeira and Canary Islands, and Asia Minor. In its native habitat little or nothing is known about its biology and habits. The egg and third-instar nymph of *R. tigrinus* have been figured and included in a key to these life stages by Puchkov and Puchkova (1956) and Puchkova (1957). According to Lindberg (1953), the species is found chiefly on low plants and weeds in waste places adjoining cultivated areas. In European USSR, *tigrinus* is noted by Kerzhner (1967) to be a general feeder with an apparent preference for members of the mustard family, the Cruciferae. Stichel (1960) has reported *tigrinus* feeding on weedy crucifers such as hoary alyssum, *Berteroa incana* (L.) DC; flixweed, *Descurainia sophia* (L.) Webb (cited as *Sisymbrium sophia*); and *Alyssum incanum* L. Stichel also noted *tigrinus* on *Trifolium* (Leguminosae) and *Cirsium arvense* (L.) Scop. (Compositae). In a study of Hemiptera associated with crucifers in Poland, Studzinski and Malachowska (1973) collected adults of *R. tigrinus* on various species of Cruciferae.

Rhopalus tigrinus at present is known in eastern North America only from a few localities (see Fig. 25). The original collection consisted of two adult males taken from wheat on a farm at North Vineland, New Jersey (Cumberland Co.), 16 August 1977, by R. Morris. In 1978, eight specimens were collected from weeds, 5 September, and three specimens from a pasture, 1 September, on farms also at North Vineland. Ten specimens were taken from grasses in a railroad yard at Camden, New Jersey (Camden Co.), Jefferson Avenue at 4th Street, 4 August 1978, by B. C. Emens. We have taken specimens at the same North Vineland and Camden locations in 1979 and 1980. AGW has found populations of adults and nymphs feeding and developing on crucifers in two railroad yards in Pennsylvania, one at west Philadelphia (along Pennsylvania Railroad near 30th Street Station) in 1980 and the other near Harrisburg (Enola Railroad Yards) in 1980 and 1981. We have found a population along a railroad track south of Yaphank, Long Island, on 30 May 1981. Furthermore, AGW and T. J. Henry (Systematic Entomology Laboratory, USDA) collected additional specimens by sweeping vegetation near Medford, Long Island (Suffolk Co.), on 29 August 1981. The fact that specimens of *tigrinus* have been taken on plants in three railroad yards in New Jersey and Pennsylvania and along the railroad on Long Island strongly indicates that this species may be dispersed passively via the railroad. Further study and field observations will be needed to support this speculation. Many other examples of this type of passive dispersal may be cited (e.g., *Catorhintha mendica* Stål (Balduf, 1957); *Coccinella undecimpunctata* L. (Wheeler and Hoebeke, 1981); *Subcoccinella vigintiquatuorpunctata* L. (Wheeler and Henry, 1981)).

Our field and laboratory observations supplement the list of host plants recorded in the literature and support the supposition that *R. tigrinus* exhibits a preference for species of Cruciferae. We have observed or have



Figs. 5–10. Structural characters. 5, Dorsal view of head, *Harmostes reflexulus*. 6, Dorsal view of head, *H. fraterculus*. 7, Dorsal view of apex of female abdomen, *Arhyssus lateralis*. 8, Metapleural region, *Stictopleurus punctiventris*. 9, Metapleural region, *Arhyssus nigristernum*. 10, Dorsal view of apex of female abdomen, *A. nigristernum*. (Figs. 5, 6, 8, and 9 redrawn from Hoffman, 1975.)

taken eggs, nymphal stages, or adults from the following cruciferous species: *Capsella bursa-pastoris* (L.), shepherd's purse; *Lepidium virginicum* L., peppergrass; *Thlaspi perfoliatum* L., a pennycress; and *Arabidopsis thaliana* (L.), mouse-ear cress. We will provide a summary of the biology and seasonal history, and descriptions and illustrations of the egg and nymphal instars in a forthcoming paper.

The following key is provided to aid in the recognition and identification of all genera of Rhopalidae now known to occur in North America (modified principally after Chopra, 1967; Harris, 1943; and Slater and Baranowski, 1978), and all species that occur in eastern North America[1] (adapted from

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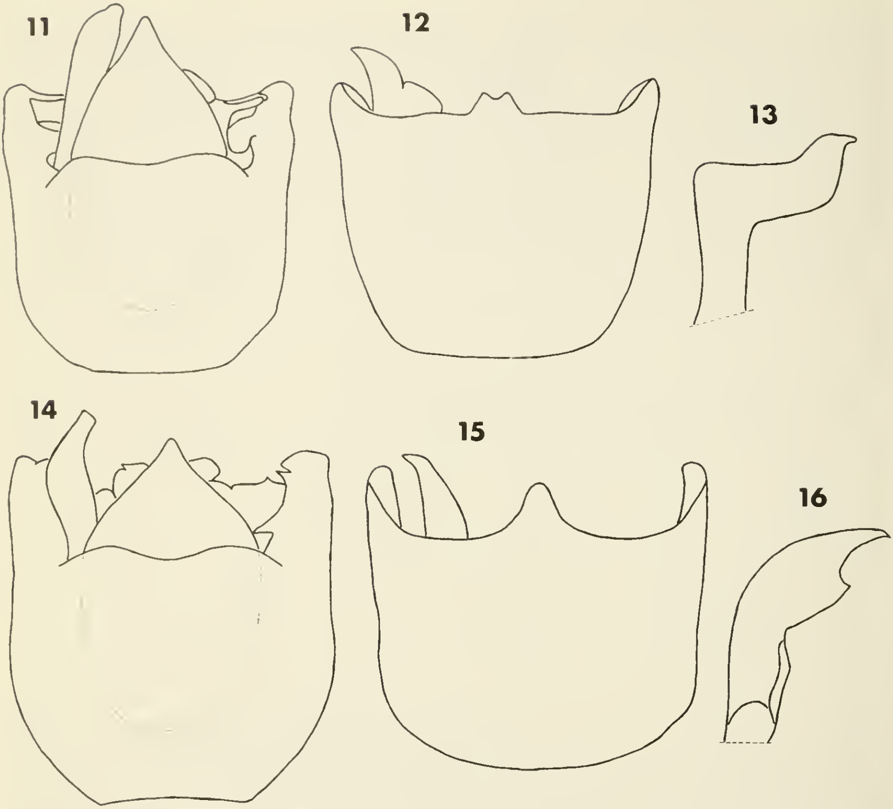
[1] Eastern North America is defined here as in Blatchley (1926): "the United States east of the Mississippi River and Canada east of the 90th Meridian."



Figs. 11–16. Male genitalia. 11, Pygophore, *Jadera haematoloma*. 12, Pygophore, *Stictopleurus punctiventris*. 13, Paramere, *S. punctiventris*. 14, Pygophore, *Jadera antica*. 15, Pygophore, *Stictopleurus knighti*. 16, Paramere, *S. knighti*. (Figs. 11 and 14 redrawn from Göllner-Scheiding, 1979; Figs. 12, 13, 15, and 16 redrawn from Göllner-Scheiding, 1975.)

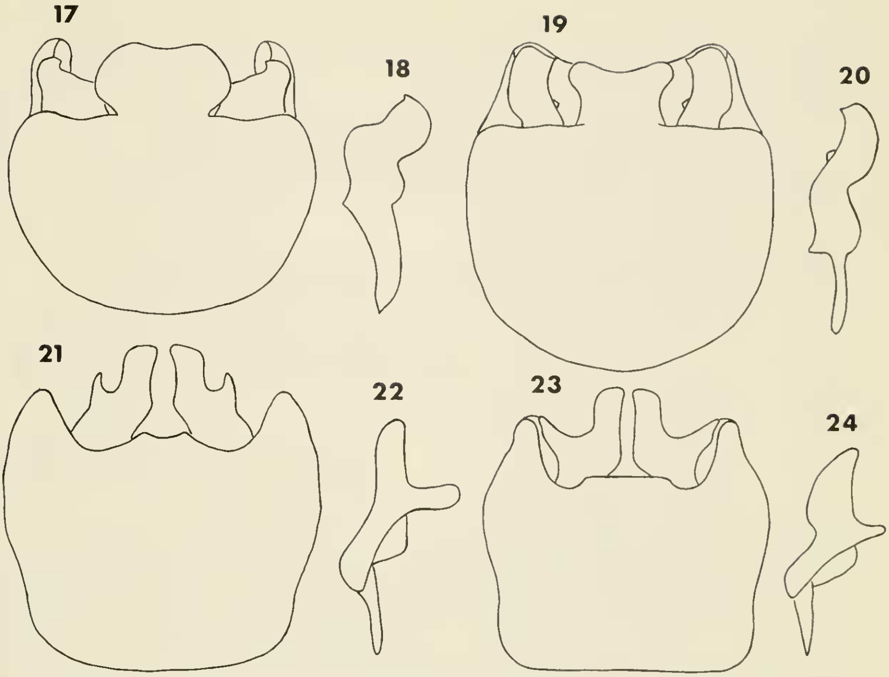
Hoffman, 1975; Harris, 1944; Chopra, 1968, 1973; Blatchley, 1926; and Göllner-Scheiding, 1975, 1976, 1978a, 1978b, 1979, 1980).

KEY TO GENERA AND SPECIES OF RHOPALIDAE IN EASTERN NORTH AMERICA

1. Lateral pronotal margins distinctly notched behind anterior margin; generally conspicuously colored; 11 mm or more in length 2

– Lateral pronotal margins straight or slightly sinuate, without a distinct notch behind anterior margin; generally inconspicuously colored; usually a little more than 9 mm 4

2. Bucculae long, reaching base of head; *Jadera* Stål (2 eastern spp.) 3



Figs. 17–24. Male genitalia. 17, Pygophore, *Niesthrea sidae*. 18, Paramere, *N. sidae*. 19, Pygophore, *N. louisianica*. 20, Paramere, *N. louisianica*. 21, Pygophore, *Arhyssus lateralis*. 22, Paramere, *A. lateralis*. 23, Pygophore, *A. nigristernum*. 24, Paramere, *A. nigristernum*. (Figs. 17–20 redrawn from Chopra, 1973; Figs. 21–24 redrawn from Chopra, 1968.)

– Bucculae short, not extending beyond middle of head; *Boisea* Kirkaldy[2] (1 sp.) .... *Boisea trivittata* (Say)
Widespread throughout North America.

3. Species predominantly brownish black; male pygophore and paramere as in Fig. 11; large species, 9.6–13.3 mm in length .... *Jadera haematoloma* (Herrich-Schaeffer)
In the U.S. known from the southeastern states west to Louisiana, Texas, and California, also from the central states including Iowa, Illinois, Kansas, Colorado, Oklahoma, and Missouri; also in Mexico, Middle America, and the West Indies to Colombia and Venezuela, and in Hawaii.

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[2] Historically, the species *trivittata*, best known as the boxelder bug, has been placed in the genus *Leptocoris*. *Boisea* Kirkaldy, originally proposed as a subgenus of *Leptocoris* and including *trivittata*, is accorded generic rank in a recent revision by Göllner-Scheiding (1980) and is so recognized here.

– Species predominantly brownish red or only reddish; male pygophore and paramere as in Fig. 14; smaller species, 7.4–10.3 mm in length .... *Jadera antica* (Walker)
Florida and the West Indies and south to Central America.

4. Hindfemur incrassate, bearing a series of prominent spines 5
– Hindfemur not incrassate, lacking prominent spines 8

5. Abdomen not dilated; hemelytra covering abdominal connexiva; *Harmostes* Burmeister (3 spp.) 6
– Abdomen dilated laterally; hemelytra not covering abdominal connexiva; connexiva widely exposed; *Aufeius* Stål (1 sp.) .... *Aufeius impressicollis* Stål
Ohio west to South Dakota, Colorado, and California and southwest to Arizona and Mexico.

6. Lateral pronotal margins irregularly, but distinctly, finely toothed .... *Harmostes serratus* (Fabricius)
Texas, Florida, Arizona, California, Mexico, and Cuba.
– Lateral pronotal margins entire 7

7. Basal antennal segment large, thickened, and extending far beyond apex of tylus (Fig. 5); costal margin of hemelytra usually unicolorous .... *Harmostes reflexulus* (Say)
Generally distributed throughout U.S. and southern Canada.
– Basal antennal segment relatively small, scarcely exceeding apex of tylus (Fig. 6); costal margin of hemelytra spotted with fuscous .... *Harmostes fraterculus* (Say)
New Jersey west to southern Indiana, Oklahoma, and California south to Georgia and Arizona.

8. Metapleuron not, or only indistinctly divided into episternum and epimeron; metathoracic scent gland openings indistinct or absent; pronotal cicatrices generally ending in a closed loop; *Stictopleurus* Stål (2 spp.) 9
– Metapleuron distinctly divided into episternum and epimeron; metathoracic scent gland openings conspicuous; pronotal cicatrices not ending in a closed loop 10

9. Male pygophore as in Fig. 12; paramere with a pronounced globose enlargement basally, strongly tapering distally, recurved so that posterior face is concave (Fig. 13); female usually grayish yellow with dark markings .... *Stictopleurus punctiventris* (Dallas)
Holarctic, across Canada and northern U.S. and southward along mountains.
– Male pygophore as in Fig. 15; paramere without subbasal enlargement, flat and tapering (Fig. 16) female distinctly reddish .... *Stictopleurus knighti* Harris
Michigan and Minnesota west to Wyoming.

10. Pronotum with a distinct, but narrow collar anteriorly; pronotum

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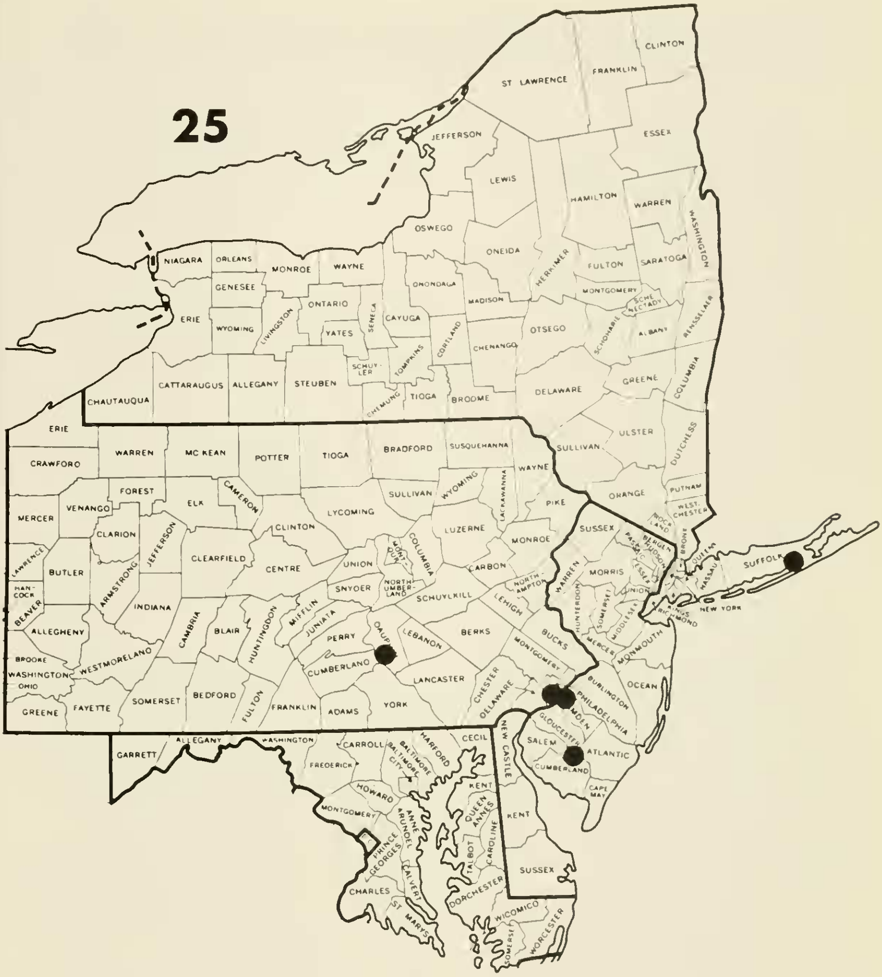

Fig. 25. Distribution of *Rhopalus* (*Brachycarenus*) *tigrinus* in eastern North America. Map shows N.Y., Pa., N.J., Md., and Del.

between collar and cicatrices forming a distinct ridge which is polished and impunctate, or at most with a few punctures; *Liorhyssus* Stål (1 sp.) .... *Liorhyssus hyalinus* (Fabricius)
Cosmopolitan; widespread throughout North America.

– Pronotum without collar anteriorly; pronotum anterior to cicatrices not smooth or polished, always with numerous coarse punctures .. 11

11. Head quite short, more than 1½× as broad as long; rostrum short, not or barely extending to metasternum; postero-lateral margin of

metapleuron strongly angulate, with a prominent and pointed projection laterally (Fig. 4); male pygophore and paramere as in Figs. 2, 3; *Rhopalus* (*Brachycarenus*) Schilling (1 sp.) .... *Rhopalus tigrinus* (Schilling)
A Palearctic species, reported new to North America; known only from New Jersey, Pennsylvania, and New York (Long Island).

– Head longer, less than 1½× as broad as long; rostrum extending beyond metasternum; postero-lateral margin of metapleuron usually straight or slightly sinuate (Figs. 8, 9) 12

12. Hindtibia possessing a number of black rings; rostrum extending to or beyond 3rd abdominal sternum; *Niesthrea* Spinola (2 spp.) .. 13

– Hindtibia often speckled or spotted with black or fuscous, but lacking a series of black rings; rostrum not extending posteriorly beyond 3rd abdominal sternum; *Arhyssus* Stål (3 spp.) 14

13. Small species, usually less than 6.5 mm; male pygophore with median lobe constricted at base, broad proximally and slightly concave distally (Fig. 17); paramere slender with subapical projection, broad and somewhat flattened distally (Fig. 18) .... *Niesthrea sidae* (Fabricius)
Maryland south to Florida and west to Oklahoma, Texas, and Arizona; also in South America.

– Larger species, usually much greater than 6.5 mm; male pygophore with median lobe slightly constricted medially and concave distally (Fig. 19); paramere slender, with subapical and dorsal projection (Fig. 20) .... *Niesthrea louisianica* Sailer
Long Island, New York south to Florida, west to Arizona and California, and in Mexico; more common in southern states.

14. Scutellum reaching to or beyond clavus; antenniferous tubercles inconspicuous or obsolete .... *Arhyssus hirtus* (Bueno)
An eastern species, known only from New York (Long Island) and Massachusetts.

– Scutellum not reaching clavus; antenniferous tubercles readily visible 15

15. Apex of last abdominal tergum of female broadly rounded in dorsal outline (Fig. 7); male pygophore with median lobe slightly concave (Fig. 21); paramere broad in middle, lateral projection with tip broadly rounded (Fig. 22) .... *Arhyssus lateralis* (Say)
Widely distributed in North America and ranging into southern Mexico.

– Apex of last abdominal tergum of female subacuminate or pointed in dorsal outline (Fig. 10); male pygophore with median lobe almost truncate (Fig. 23); paramere flat, broad, lateral projection with tip narrowly rounded (Fig. 24) ..... *Arhyssus nigristernum* (Signoret)

Widely distributed in eastern North America, ranging from Quebec and Ontario south to central Florida and west to Oklahoma and Kansas.

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LITERATURE CITED

Balduf, W. V. 1957. The spread of *Catorhintha mendica* Stål. Proc. Entomol. Soc. Wash. 59: 176–185.

Blatchley, W. S. 1926. Heteroptera or true bugs of eastern North America, with especial reference to the faunas of Indiana and Florida. Nature Publishing Co., Indianapolis, 1116 pp., 215 figs., XII pls.

Chopra, N. P. 1967. The higher classification of the family Rhopalidae (Hemiptera). Trans. R. Entomol. Soc. Lond. 119: 363–399, 75 figs.

———. 1968. A revision of the genus *Arhyssus* Stål (Rhopalidae: Hemiptera). Ann. Entomol. Soc. Am. 61: 629–655, 146 figs.

———. 1973. A revision of the genus *Niesthrea* Spinola (Rhopalidae, Hemiptera). J. Nat. Hist. 7: 441–459, 16 figs.

Göllner-Scheiding, U. 1975. Revision der Gattung *Stictopleurus* Stål. Dtsch. Entomol. Z. 22: 1–60.

———. 1976. Revision der Gattung *Liorhyssus* Stål, 1870 (Heteroptera, Rhopalidae). Dtsch. Entomol. Z. 23: 181–206.

———. 1978a. Revision der Gattung *Harmostes* Burm., 1835 (Heteroptera: Rhopalidae) und einige bemerkungen zu den Rhopalinae. Mitt. Zool. Mus. Berl. 54: 257–311.

———. 1978b. Bemerkungen zu der Gattung *Rhopalus* Schilling einschliesslich *Brachycarenus* Fieber (Heteroptera, Rhopalidae). Mitt. Zool. Mus. Berl. 54: 313–330.

———. 1979. Die Gattung *Jadera* Stål, 1862 (Heteroptera, Rhopalidae). Dtsch. Entomol. Z. 26: 47–75.

———. 1980. Revision der afrikanischen Arten sowie Bemerkungen zu weitern Arten der Gattung *Leptocoris* Hahn, 1833, und *Boisea* Kirkaldy, 1910. Dtsch. Entomol. Z. 27: 103–148.

Harris, H. M. 1943. Concerning the Rhopalidae (Hemiptera). Iowa State Coll. J. Sci. 17: 197–204.

———. 1944. Concerning American Rhopalini (Hemiptera, Rhopalidae). Iowa State Coll. J. Sci. 19: 99–109.

Hoebeke, E. R. 1977. (Note). *In* Cooperative Plant Pest Report 2(40): 802.

Hoffman, R. L. 1975. Squash, broad-headed and scentless plant bugs of Virginia (Hemiptera: Coreoidea: Coreidae, Alydidae, Rhopalidae), *In* "The Insects of Virginia," No. 9, Va. Polytech. Inst. State Univ. Res. Div. Bull. 105, 52 pp., 20 figs.

Kerzhner, I. M. 1967. Order Hemiptera (Heteroptera), pp. 851–1118. *In* Bei-Beinko, G. Ya., ed., Keys to the insects of the European USSR, Vol. 1. (Translated from Russian. Israel Program for Scientific Translations, Jerusalem.)

Lindberg, H. 1953. Fam. Coreidae (subfam. Corizinae), pp. 52–54. *In* Hemiptera Insularum Canariensium. Societas Scientiarum Fennica, Commentationes Biologicae XIV.1. Central tryckeriet, Helsingfors.

Puchkov, V. G. and L. V. Puchkova. 1956. A key to the eggs and larvae of Hemiptera-Heteroptera injurious to crops. Tr. Vses. Entomol. Obva. 45: 218–342. (In Russian.)

Puchkova, L. V. 1957. Eggs of Hemiptera-Heteroptera. III. Coreidae (Supplement), IV. Macrocephalidae. Entomol. Obozr. 36: 44–58. (In Russian.)

Slater, J. A. and R. M. Baranowski. 1978. Family Rhopalidae, the scentless plant bugs, pp. 66–70. *In* How to know the true bugs (Hemiptera-Heteroptera). Wm. C. Brown Company Publishers, Dubuque, Iowa.

Stichel, W. 1960. Pentatomomorpha, Coreiodea: Corizidae, vol. 4, 14 Heft, pp. 417–448. *In* Illustrierte Bestimmungstabellen der Wanzen. II. (Europa Hemiptera-Heteroptera Europae). Martin-Luther, Berlin–Hermsdorf.

Studzinski, A. and D. Malachowska. 1973. Tluskwiaki Roznoskrzydle (Heteroptera) wystepujace na dziko Rosnacych roslinach Krzyzowych (Cruciferae) w Polsce w 1970 R. [Hemipterous bugs (Heteroptera) occurring in 1970 on wild cruciferous plants (Cruciferae) in Poland]. Rocz. Nauk. Roln. Ser. E Ochr. Rosl. 3: 79–100. (In Polish with English summary.)

Wheeler, A. G., Jr. and T. J. Henry. 1981. Seasonal history and habits of the European alfalfa beetle, *Subcoccinella vigintiquatuorpunctata* L. (Coleoptera: Coccinellidae). Coleopt. Bull. 35(2): 197–203.

Wheeler, A. G., Jr. and E. R. Hoebeke. 1981. A revised distribution of *Coccinella undecimpunctata* L. in eastern and western North America (Coleoptera: Coccinellidae). Coleopt. Bull. 35(2): 213–216.